

Speed of Light

The speed of light varies depending on the medium.

In a vacuum, the speed of light is 3×10^8 m/s.

The index of refraction can be used to determine the speed of light in any medium:

$$n = \frac{c}{v}$$

Where c is equal to the speed of light in a vacuum, and v is the speed of light in the new medium.

Chapter 17 HW

- ♦ Review Questions: 1-7, 10 - 12, 19 - 22, 31 - 43, 49 - 54.

Due Wednesday

Critical Angle

If a light comes to a medium that is less dense, the ray can either be refracted and travel into the new, less dense medium, or the light can be reflected back into the medium.

If the ray hits the new medium at an angle less than the critical angle, it will refract through the new medium. If it is greater, the ray will reflect.

Critical Angle

- ◆ A ray traveling at the critical angle will travel along the surface of the new medium.

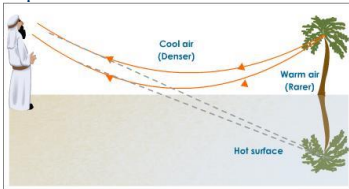
Therefore:

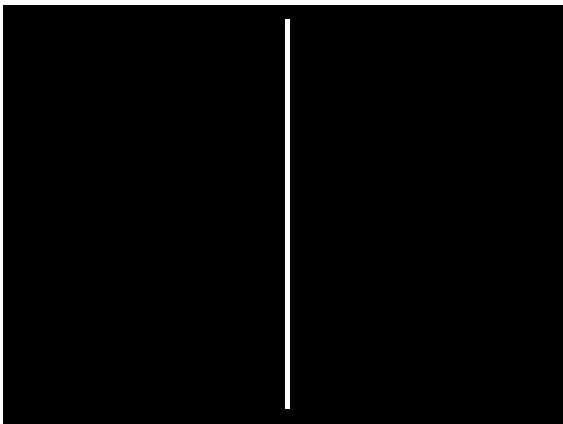
$$\sin \theta_c = \frac{n_r}{n_i}$$

Where θ_c is the critical angle, n_r is the index of refraction of the new medium, and n_i is the index of refraction of the original medium.

Mirages

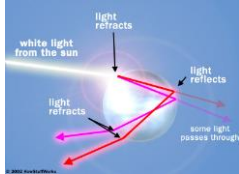
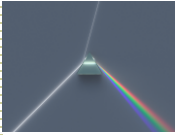
- ◆ Because warm air has a greater index of refraction, the light from an object is continuously bent, making that object appear like light being reflected from a puddle.





Rainbows & Dispersion

- ♦ Prisms are devices which divide light. The red light is least affected by refraction, while violet light is most affected. The white light is then separated into a rainbow of colors. Water droplets act as natural prisms.

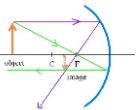


Kinds of Mirrors

Plane Mirror - a flat, smooth surface from which light is reflected by regular reflection and not diffuse reflection.

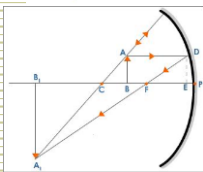
In a plane mirror, the object is reflected as an image within the mirror. The image should be an exact copy of the object.

Kinds of Mirrors



Concave Mirror - A mirror that reflects light from its "caved in" surface. The light striking a concave mirror is reflected to a given point (focus).

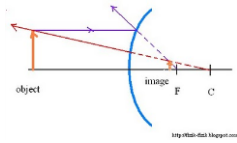
An object placed beyond the focal point will have an image that appears inverted. An object placed between the focal point and the mirror will have an image that is magnified.



Kinds of Mirrors

Convex Mirror - A mirror that reflects light from its outside surface. The light striking a convex mirror is diverged.

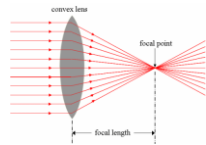
An object in a convex mirror will appear smaller. Images in a convex mirror appear to be more spread out.



Lenses

A lens is a piece of transparent material that has a refractive index larger than air.

- A convex lens is thicker at the center than at the edges, and converges parallel light rays



Lenses

- Concave lens** - a lens that is thicker at the ends than at the middle, which diverges parallel light rays.

